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Argentine Agricultural Policies in the Grain and Oilseed Sectors

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Abstract

Argentina's new Government intends to spur agricultural growth, particularly in the grain and oilseed sectors, during the eighties by expanding farmland, increasing productivity, and improving transportation and storage facilities. Because Argentina's farm sector recovery will likely be slow and difficult, the United States will probably lose few farm export customers to that country during the eighties. To ease the financial burden on farmers, the Argentine Government must maintain political stability, blunt inflation, reduce the national debt, and develop successful farm policy programs.

Keywords: Argentina, farm policy, trade policy, agricultural prices, agricultural trade, grains, oilseeds, cattle.

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Contents

	<i>Page</i>
Summary	v
Introduction	1
Background	1
Trends in Grain and Oilseed Production	2
Policy Formulation	2
Trade Policies	5
Exchange Rate Controls	5
Export Taxes	6
Import Restrictions	6
Domestic Policies	7
Agricultural Prices.....	7
Agricultural Credit.....	8
Tax Policy	9
Policy Implications	9
Price Relationships	9
Patterns of Production.....	10
Concluding Remarks	12
References	14
Appendix Tables	16

Summary

Argentina's agricultural recovery depends on its Government's ability to cut spending and reduce deficits. Argentine farmers, who lag other industrial world farmers in technological advances, have faced decreased global demand for farm products, increased competition, and weak domestic support for agricultural improvements. Although the new Government intends to make Argentina more competitive in the global grain and oilseed markets during the eighties, the chances for Argentine agricultural recovery are restrained at best.

By improving the agricultural sector and related infrastructure, Argentina may recapture a segment of world markets now held by the United States, Canada, Australia, and Europe. Battered by ineffective price policies, unfavorable foreign exchange rates, and high external taxes and tariffs, the agricultural sector must somehow increase productivity while reducing costs. The Government is studying the following options to achieve this goal:

- Expanding farmland by devoting some fertile pastureland to grain crops.
- Increasing productivity by using more fertilizer on field crops.
- Improving transportation and storage facilities.

Low producer prices and high tariffs forced Argentine farmers to pay much more for agricultural inputs than most growers in the leading grain-exporting countries. For example, during 1976-79, Argentine farmers' expenses per unit of output for fertilizers, fuel, herbicides, and tractors were among the highest for advanced farm economies.

Argentina's productivity must be improved to challenge the world's principal grain exporters. During 1977-80, Argentina produced only 17.4 metric tons of grain per worker. In contrast, the United States achieved 115.8 metric tons per worker, Canada 73.3 metric tons, and Australia 58.4 metric tons.

Argentine Agricultural Policies in the Grain and Oilseed Sectors

Myles J. Mielke*

Introduction

Political and economic instability and heretofore ineffectual Government programs have hampered Argentina's vast agricultural potential. Agriculture is the largest contributor to Argentine exports, but has failed to enhance its share of the world food and feed markets because of a lack of technological advancements and capital investments. This report reviews policies which affected both production and exports of Argentina's principal grains and oilseeds since the thirties. The United States was the main competitor of Argentina in the world export market for these commodities.

Background

Argentina's agricultural potential revolves around some of the richest farmland in the world and the necessary climatic conditions to produce most temperate zone crops. The population is highly literate, and the country has the necessary structural characteristics and marketing expertise of a major world exporter.

Much of the land base is occupied by natural pastures, largely devoted to extensive cattle operations, accounting for roughly 140 million hectares, about six times the land devoted to grains and oilseeds and one-half of the total land base. The cattle population expanded significantly after the early fifties, increasing by 20 million head through the end of the seventies to an average 59 million. Producers raise more than 50 percent of the cattle within major crop zones of the Pampa (a large treeless grassland area).

Farm production has long been an integral part of Argentina's economic development, providing food and labor to the industrial urban centers. Agriculture has

contributed most to foreign reserves: farm commodities constituted over 90 percent of total exports during the forties, and they accounted for about 75 percent into the eighties.

Argentina produces six major grain and oilseed crops which compete in world trade: wheat, corn, sunflowers, linseed, grain sorghum, and soybeans. They account for 55 percent of total cropland and 45 percent of total crop production, and 40 percent of total agricultural export value and nearly 70 percent of the trade in nonlivestock commodities. Although this study focuses on the crop sector, the analysis will include beef production and trade for comparison purposes.¹

Agricultural export receipts provided much of the necessary foreign exchange to import raw materials and intermediate goods for industrial production. Farm exports produced a substantial amount of public revenues which were also largely used to promote industrial development. Export taxes alone accounted for a large percentage of total federal income. Agriculture provided a foundation for related industries and employment in food processing, clothing manufacturing, and animal feed mixing.

Most major agricultural export commodities, however, saw a reduced share of world trade during the past four decades (app. table 13). Part of the decline resulted from increasing export competition, principally from the United States, Canada, Australia, and the European Community. Restrictive import requirements in other countries also hindered Argentine export expansion, such as prohibiting fresh beef shipments from endemic hoof-and-mouth disease areas. Perhaps the most important reason for export declines in grain was the relatively slow growth in

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¹The cattle sector is not directly included because the decline in beef trade shares mainly stemmed from import demand constraints rather than supply limitations (23). (Italicized numbers in parentheses cite sources in the References section.)

production, considerably below that of most major world producers and exporters. When global import demand expanded, Argentina could not respond.

Argentina's production of traditional export crops grew slower than that of most other world producers since the midsixties (app. table 9). Growth in wheat and corn output was among the lowest of the principal producers and exporters. Estimates for sunflowers and linseed ranged well below the growth leaders, United States for sunflowers and India for linseed. Soybeans in Argentina and Brazil, sunflowers in the United States, and sorghum in Argentina and Australia all registered sharp growth in production from a small base.

The growth pattern of Argentine grain and oilseed production followed post-World War II policies which have changed little since then. Political instability and high inflation have created uncertainty and additional economic risks. Farm producers have responded by adopting cultivation practices which minimized costs and spread the risks over alternate production possibilities; this may have resulted in lost production potential. Area devoted to grains has virtually stagnated since the thirties, and increases in grain yields, while substantial, were still insufficient to bring the Argentine average up to the level of most major world producers. Oilseed production has made significant advances, largely at the expense of the traditional grain exports, wheat and corn.

Trends in Grain and Oilseed Production

Between the early thirties and late seventies, growth in total crop production averaged 1.3 percent per year.² The equivalent growth rate for the grain sector was 0.7 percent and for oilseeds 2.1 percent. Most of the increase in production resulted from improved yields when total cropland increased only 284,000 hectares over the entire period (app. table 2). Area devoted to grain production actually declined from its peak during the thirties. Much of the grain area was switched to oilseeds, and growing cattle herds diverted land to pasture.

Argentine grain area has held relatively constant until recently. Area planted to wheat and corn decreased steadily until the late fifties. Then wheat and corn area

gradually increased during the sixties into the seventies but never reached the level of peak years. The rapid expansion of grain sorghum that began in the late fifties accounted for much of the recovery in grain area. Cattle producers sought other feed sources to supplement natural pastures, and in some cases, to substitute for corn and wheat. Strong export demand during the sixties reinforced sorghum expansion and exports increased rapidly.

Total oilseed area recovered from a decline when soybean plantings almost doubled total oilseed area by the second half of the seventies despite sharp declines in linseed area. Favorable world soybean prices, existing technology, and earlier investments in farm equipment prompted producers to substitute soybeans for other crops. The soybean expansion came largely at the expense of corn land, which declined by over 1 million hectares during the seventies. The significance of the soybean/corn substitution process has since diminished because 80 to 90 percent of the soybean area is now doubled-cropped with wheat.

Substantial improvements in average crop yields during the seventies offset slow cropland expansion and helped spur increases in production (table 1 and app. table 3). Area expansion and improved yields accounted for gains in wheat production after the midseventies. Corn and sunflowers showed improved average yields during the same period. By the early eighties, Argentine crop yields compared favorably to those of other major world producers, except for high-productivity countries such as the United States, Canada, France, and Italy (app. tables 10 and 11). Average yields for sorghum, linseed, and soybeans joined the highest of the world's producers, an especially remarkable accomplishment given that the use of chemical fertilizer per unit of land was one of the lowest in the world, averaging 3 kilograms per hectare of cropland (app. table 12).

Policy Formulation

Contemporary economic policies can be traced to the thirties and forties when the Argentine Government began to intervene in production and marketing decisions. Current agricultural policy was formulated during this period of structural and economic reform.

The dual crises of a world economic depression followed by world war established conditions through which the

²Total agricultural production for 1940-72 grew 1.4 percent, annually, in contrast to 3.7 percent for the nonagricultural sector (10).

Government acted to protect its evolving economy. The worldwide depression reduced agricultural exports and upset the country's balance of payments. To soften worsening terms of trade, the Government began an import-substitution program for manufactured goods, and, for the first time, a multiple exchange rate scheme emerged in 1933.³ Support prices exceeded market levels for wheat, corn, and linseed during 1933-35 to stimulate farm production. The price support program combined with favorable exchange rates for agricultural exports to begin the largest expansion of grain and oilseed area in Argentine history. Strong export demand during the latter half of the thirties stimulated further growth.

World War II brought difficult times to agricultural producers and traders. Disrupted market and shipping activities produced the largest grain surpluses in Argentine history. However, storage capacity was inadequate and losses were great (27). Agricultural prices rose only 1.2 percent, annually, during 1939-44 compared with industrial price increases of 11.4 percent per year

³Some of the "infant industries" protected by tariff barriers that later developed into important agricultural exports included fruits, lint cotton, and edible oils.

(26). Price-cost ratios were generally unfavorable for grains during the initial war years and planted area declined.

Export prospects failed to improve during the immediate postwar period. Conditions following the war were, at best, disorganized in European countries, traditional customers for Argentine exports. Fodor maintains that the United Kingdom, once Argentina's largest trading partner, became an unreliable market because of reduced sterling convertibility after August 1947 (18). Furthermore, the United Kingdom was unable to supply the level of imports Argentina required to expand its industrial base. Argentina's export concentration in Europe and trade restrictions in other potential markets, such as the United States, sharply reduced its trade opportunities after the war. These difficulties and the experience of the Depression propelled the first Peron government (1946-55) into power.

Unstable world economic order was seen as sufficient reason by the postwar Peronist government to turn inward for its economic development. Industry became the primary engine of development. Goals of the

Table 1—Change in average annual production growth rates for selected grains and oilseeds¹

Item	Wheat	Corn	Sorghum	Soybeans	Sunflowers	Linseed
<i>Percent</i>						
1951-65:						
Area	-0.7	1.8	29.6 ²	342.6 ³	0.9	4.7
Yield	2.1	1.5	1.0 ²	1.4 ³	-.5	0
Production	1.9	5.0	34.4 ²	54.1 ³	1.9	5.8
1966-80:						
Area	-1.4	-2.5	4.0	46.8	2.6	-2.8
Yield	2.3	3.5	4.0	5.6	.2	2.2
Production	1.5	1.1	11.1	55.9	2.6	.2

¹Growth rates based on moving averages.

²1953/54 to 1964/65.

³1954/55 to 1965/66.

Source: (9).

economic recovery program included repayment of the external debt, nationalization of foreign firms, and maintenance of high employment levels. Specific agricultural objectives of the Peron government were to:

- shift economic and human resources from rural to urban sectors,
- redistribute resources within the agricultural sector from the landed class (owners) to the landless tenants and workers, and
- generate revenue and foreign reserves for industrial development through agricultural exports.

The economic policy goals of the Peron government continued, with minor modifications, throughout most of the following three decades. The Government nationalized mass transportation, warehousing, port operations, and communication services. The Government developed the steel, mining, and heavy manufacturing industries, and nationalized oilfields and refineries as well as the distribution of petroleum and gas products. National, provincial, and municipal jurisdictions controlled electrical generation and distribution. Government intervention extended to controls in banking and foreign trade which limited imports mainly to raw materials and semimanufactured goods for use by incipient domestic industries.

Trade regulations, such as exchange rate controls and import tariffs, begun during the Depression, became institutionalized and supported by other measures to strengthen state control over foreign trade. The Argentine Institute for the Promotion of Trade (IAPI) controlled agricultural trade. IAPI controlled all exports, including farm goods, and, as sole buyer, made all domestic purchases, including wheat, corn, and linseed at fixed prices. Later IAPI traded in other grains and oilseeds. These measures and Government bilateral trade agreements reduced the private trader's role to that of broker acting as agent for the central Government. Private traders received contracts to purchase grains from first handlers and to make arrangements for transportation to incountry and port storage facilities. IAPI also administered imports of food and agricultural inputs.

The Government regulated grain and oilseed marketing through 1946-55 with fixed producer prices and subsidized retail food prices. The Government took over port handling and storage facilities and nationalized the

railroads in 1946-47 when trains carried the bulk of the internal grain shipments. The futures market closed and never reopened. Some of the earlier price and marketing regulations eased during the late forties and early fifties when the Government attempted to reduce the trade deficit by stimulating production and exports of its major agricultural commodities.

Peron's state-run economy ended abruptly in September 1955 after a military takeover. Political instability marked the period 1955-73. The Government changed six times, coming under four military regimes and two civilian administrations. Although specific policies varied from government to government, the economy became more market-oriented, despite continuing state intervention in market and trade activities.

IAPI and many of its regulations vanished in 1955. The Junta Nacional de Granos, or National Grain Board (NGB), took over much of the former authority of IAPI. Since 1956 the NGB has served as the primary agency responsible for the administration of Government programs in the grain and oilseed trade. Unlike IAPI, however, the NGB does not import food or agro-industrial commodities.

International grain and oilseed trade gradually returned to the private sector. In 1959 wheat was the last commodity decontrolled. Market-determined prices set by daily quotations replaced administered prices on the commodity exchanges. Export duties stayed generally low during the late fifties through the sixties except for a 25-percent grain export duty imposed in 1958 (app. table 7). Port elevator construction by private companies returned in 1963, partly easing the restrictions imposed in 1944 when the Government expropriated port storage facilities. Administration of publicly owned port facilities, however, continued under the jurisdiction of the NGB which refrained from direct market intervention except when it imported grains to offset production shortfalls.⁴

The situation changed dramatically in 1973 when the second Peron government (1973-76) was elected and reintroduced most of the economic policies of the earlier Peron administration. NGB implemented many of the policies once administered by IAPI, and it became the only trader in wheat, corn, grain sorghum, and

⁴The NGB made unscheduled wheat imports in 1967, 1969, and 1974 to make up the difference between production shortfalls and export commitments.

sunflowers. Reimposed high export taxes and exchange rate controls determined the production and trade of these export commodities during the period. Although few trade quotas previously existed, the Government banned vegetable oil exports between 1973 and 1976 to assure domestic supplies and control consumer prices.

Political upheaval and economic deterioration prompted a military junta to take power in March 1976. The military gradually returned control of the economy to the private sector. The new Government lifted domestic price controls and returned agricultural marketing to private traders. In late 1979, the Government authorized private traders to invest in terminal port facilities and to rent state-owned storage capacity for private use. (The official decree became known as the Grain Law.) The Government removed export taxes on all major grains and oilseeds by November 1976. However, the Government has since reimposed export duties to absorb windfall profits generated by peso devaluations, to control foreign exchange reserves, and to raise revenues.

The NGB continues to administer the commodity price support program for grains and oilseeds, to manage Government-owned storage facilities including port elevators, to collect export taxes and special-purpose levies, to issue export licenses, and, when necessary, to set export quotas. The NGB's responsibility for negotiating bilateral trade agreements extended to talks with the Soviet Union after the U.S. grain suspension in 1980. Only general agreements were reached, however, on the volume of grain and oilseed trade. Specific contract terms, including sale prices and shipping schedules, must be worked out between private traders and the importing country.

Trade Policies

Trade policies influenced agricultural production during most of the period covered in this report. Exchange rate controls, high trade taxes, and import restrictions disrupted domestic product and factor markets of most agricultural commodities, particularly grains and oilseeds.

Exchange Rate Controls

To help control domestic prices and to maintain foreign reserves, the Government used exchange rate controls.⁵

⁵One of Argentina's most chronic economic problems, inflation, has colored economic policies and inhibited long-term economic planning. Inflation, at times the highest in the world, became persistent during the forties. Since 1965 the annual compound growth of the wholesale

A chronically overvalued Argentine peso damped domestic prices of agricultural commodities destined for export. Under the controlled exchange rate regime, exporters could only exchange their receipts at an official rate which was usually lower than the free market rate. Exporters could compensate by raising prices, but their share of world trade for most agricultural exports was not large enough to determine prices (app. table 13). Exporters passed on exchange rate losses to producers through lower prices.

Some form of controlled multiple exchange rates spanned most of the period covered in this report. Two foreign exchange markets, introduced during the first Peron administration, existed with fixed conversion rates in each. These markets have had various names; here they are called "commercial" and "financial." The system was based on Central Bank purchases of foreign exchange from exporters in the low-price (in pesos) commercial market and on sales of foreign exchange to importers in the high-priced financial market. The exchange difference accrued to the Central Bank as a profit and contributed heavily to public revenues. The degree of spread between the commercial and financial rates was as high as 100 percent during some periods.

The Government introduced a single foreign exchange rate in 1955 with periodic devaluations adjusted for inflation. As part of a national economic development plan, multiple exchange rates returned in 1971 and continued until late 1976. For exchange purposes, a set of mixed rates required that all international commodity transactions be liquidated in both markets according to a commodity-specific schedule of proportions. The two exchange markets and the mixing rates constituted the exchange control regime. For a time, mixing rates changed daily, market rates less frequently. A single exchange rate spanned the period from late 1976 to May 1978 when multiple exchange rate controls returned. The Government unified exchange rates in November 1982, adjusted by daily devaluations.

Even during periods of relatively small price increases, exchange rates for commercial trade dropped below the financial or free market rates. The Government prevented official exchange rates from adjusting to account for domestic inflation. Devaluations, adjusted for differentials

price index averaged about 80 percent. The inflation rate rose to an annual average of 115 percent during the seventies; the sharpest increases came after 1974.

in domestic and international price movements, were either *ad hoc* or scheduled as a crawling peg but were usually too little to compensate for the difference.

The overvaluation of the peso stands as a persistent form of indirect taxation on agricultural exports. Estimates varied on the effectiveness of overvaluation in keeping domestic prices below comparable international levels. Periods of exceptionally large deviations between nominal and equilibrium rates of exchange occurred during the second halves of the fifties and sixties and most of the seventies. During 1968-74 the overvaluation averaged 38 percent, according to a World Bank study (8). Reca found a smaller differential using another methodology, but both studies pointed to a substantial reduction in farm prices and income (27).

Export Taxes

The inability to increase domestic tax revenues prompted Argentine authorities to rely on export taxes as a primary source of revenue.⁶ Export tax receipts originally supported industrial development. Because agriculture accounted for most exported goods, export taxes resulted in a transfer of income from rural to urban sectors. Revenue generated by *ad valorem* export duties helped finance industrial imports and subsidized food prices. Export duties were periodically increased, ostensibly to prevent excessive profits resulting from large peso devaluations.

Tax rates reached their peak during the second Peronist government averaging 30 to 50 percent of the value of exports (app. table 7). The Government taxed traditional grain and oilseed commodities more heavily than beef or other processed exports. The duties, collected through the foreign exchange mechanism, deducted the appropriate amount from the commercial exchange rate. Exporters, in turn, paid their suppliers the export price less the value absorbed in the exchange rate transaction.⁷

Other minor taxes arose from export sales. Beginning in 1956, the Government collected specific taxes to fund the operations of three federal agricultural agencies (the NGB, the Junta Nacional de Carnes or National Meat

Board, and the National Agricultural Technology Institute (INTA)), and to support Government services, such as grain elevator construction, rural highway maintenance, and statistical reporting. The tax rates varied occasionally but generally ranged from 2.5 to 5.5 percent of the export value. Funding for the Meat Board later came from an internal tax on the sale and slaughter of cattle. A value-added tax (VAT) system replaced all specific export taxes in 1980, and the previously named agencies now received funding from general revenues.

The Government reestablished export taxes in July 1982 to generate additional public revenues and to prevent windfall profits. A 25-percent duty covered unprocessed crop exports, and a 20-percent duty covered unprocessed meats. Processed commodities received lower tax rates depending on the type of product and country of destination.

To encourage exports of nontraditional and higher valued commodities, the *ad valorem* duties dropped to 15 percent on oilseed meal (except soybean) and meat cuts; to 10 percent on oilseed oils, soybean meal, wheat flour, milled rice, and confectioners' peanuts; and zero on other meat products such as cooked and canned beef. Tax rebates applied if commodities went to new markets.

Import Restrictions

Import substitution policies led to high import tariffs that protected Argentine industry and kept domestic prices high. *Ad valorem* tariffs, initiated during the Depression, reached a high of 200 percent for luxuries and 90 percent for industrial goods. The Government placed prohibitive tariffs on agricultural inputs to protect domestic suppliers. Pre-1977 *ad valorem* tariffs for representative agricultural inputs were: tractors, 60 percent; agricultural chemicals, 65 percent; seeds, 60 percent; and fertilizer, 60 percent. The import tax on fertilizer directly affected some 70 percent of total fertilizer use in 1983. Nontariff barriers included exchange rate controls, quotas, licensing and documentation regulations, and financing and prior-deposit requirements.⁸

In 1977 the Government began a gradual reduction in the overall tariff schedule. A rate decrease was allowed for commodities not produced locally and products whose prices had not increased faster than justified by the gen-

⁶A recent estimate placed the share of federal receipts attributable to agricultural export taxes at around 30 percent.

⁷A dollar value (index price) was assigned each commodity, then multiplied by the tax rate (as a percentage). The resulting amount was then subtracted from the dollar equivalent of the transaction.

⁸Before 1979, for example, the Government banned low-horsepower tractor imports.

eral price index. The Government's goal: reduce the tariff to a range of 10 to 40 percent with an average tariff of 25 percent by January 1984. As of that date, import taxes ranged from 5 to 38 percent of import value.

Domestic and import price differentials changed dramatically during the first few years of the program. The difference between nominal import prices and prices needed by domestic producers to compete with imports was about 80 percent in June 1977. By August 1979, the differential dipped to 30 percent (43). During the early eighties, import taxes on agricultural inputs decreased to 13 percent on field and row crop seeds, 20 percent on farm machinery, other than tractors, and zero on fertilizers and pesticides not produced domestically. Urea, locally produced, was taxed at 28 percent. Tariffs on tractor imports fell to an average 29 percent in 1983 and units over 140 horsepower entered duty free. In early 1984, the Government announced the elimination of the existing 25-percent tariff on urea fertilizers and a tariff reduction for other nitrogen fertilizers.

Domestic Policies

Low farm taxes and a subsidized, although limited, credit program favored producer returns and shaped production patterns. Support prices, however, had little effect on farm income or the reduction of economic risks associated with farm production.

Agricultural Prices

The Government's agricultural price policy provided little income protection or price stability, two principal functions normally associated with price programs. Instead official prices were used as a reference to inform producers of market conditions and to prevent intermediaries from taking advantage of producers during harvest.

A price support program for grains and oilseeds, initiated during the thirties, did not become a permanent policy tool until the midfifties. The NGB had to purchase grain and oilseeds under the program at the official price. However, the only significant purchases occurred during 1963-64 and 1973-75. During the latter period, the NGB was the only buyer, and Government decree fixed prices received by farmers. The NGB purchased only wheat in large quantities for resale to private millers, which satisfied bilateral trade contracts. Thus wheat became the crop most sensitive to price policy. On some occasions, other grains were purchased by the NGB to fulfill export obligations.

From 1957 to 1966, the support price was also the minimum price, below which no trade could legally be conducted. From then through the 1969/70 crop year, the Government established separate minimum trading prices and support prices for grains and oilseeds. The NGB returned to a single price in the 1970/71 crop year. The two-tier pricing system, reintroduced during the 1973/74 crop year, disappeared when the military government came to power in 1976.

Most producers chose to sell their commodities in the private market rather than to the NGB. Producers favored sales to private traders because the NGB offered only partial payment with the balance due after a delay of several months.⁹ High inflation and producers' short-term loan obligations made immediate cash sales desirable even at prices below the official price.

Rapid inflation aggravated the problem of maintaining a price support system. The Government made frequent, but often inadequate, modifications to maintain real prices, often changing pricing criteria and applying unscheduled adjustments for inflation. Another problem not evident from the statistics showed that official prices were seldom made public in time to affect producer decisions before planting. For example, about 80 percent of the time official wheat price announcements came after the beginning of the May planting season. Timely support price announcements, which should reduce producer uncertainty and risk, usually followed the beginning of the sowing season and often were not announced until the November-January harvest.

As a result, guaranteed prices seldom provided a floor for market prices, except for wheat and during periods of fixed prices. Official prices were significantly below commercial prices in most years (app. table 4). Furthermore, a grain reserve program did not exist to support a minimum price or to stabilize prices. Producers had to rely on the NGB's assurances that it would purchase quantities offered at the official price. However, the NGB had few financial resources and little storage capacity to implement such a program. Most of the NGB's funds came from a special export tax on grains and oilseeds which limited its discretionary spending. Perhaps more important, the country's inadequate storage facilities failed to

⁹For example, in the late sixties, the NGB paid 70 percent of the sale value at the time of delivery with the balance due within 4 months (20). Interest was paid on the delayed payments, but inflation tended to reduce any real gains from interest earnings.

allow for large carryover stocks necessary to operate an effective grain reserve program.¹⁰ Because of these conditions, the Government bought limited quantities of grains and oilseeds under the price guarantee program and usually only after it had concluded a bilateral trade agreement.

A pricing scheme that established a fixed margin between international and domestic prices replaced the support price program in 1977. Producers of major grains and oilseeds were guaranteed 80 to 85 percent of the export (f.o.b.) price. Only wheat was covered by an administered price, now called a "reference price," which can be adjusted when export prices change but to no less than 85 percent of the export price. This policy prevents export traders from bidding domestic prices too far below the international price but at the same time does not put a floor under domestic prices.

Agricultural Credit

The Government has subsidized public agricultural credit since the forties. During most of the past three decades, nominal interest rates for agricultural credit were not fully adjusted for inflation (19). Interest rates ranged substantially below going market rates.

Eighty percent of agricultural credit originates in public financial institutions. The Banco de la Nacion (National Bank) once supplied over half of the agricultural loans; the rest came from provincial banks. The National Bank's contribution has since declined to about one-third. Nearly 70 percent of the National Bank's loans to the crop sector financed operating expenses and the remainder supported capital formation and disaster relief programs. Shortrun loans, normally granted for no more than 180 days, covered cultivation and harvesting costs. Rural distributors also provided short-term credit to purchase production inputs, such as seeds and agricultural chemicals. The number of longer term loans for capital accumulation increased in the late sixties when producers bought much of their farm equipment. Funding for agricultural development came mostly from domestic sources, but few projects originated with external financing.¹¹

¹⁰Current estimates of storage capacity for grains and oilseeds average 20 million metric tons, or roughly one-half of total production.

¹¹Two major exceptions were the Balcarce project, which provided credit for improved cattle production in Buenos Aires province, partly funded by the Agency for International Development, and an Inter-American Development Bank loan, which financed agricultural equipment purchases beginning in 1963.

Spotty and limited availability of institutional credit exposed producers to additional economic risks because most of them needed nonfarm financing to cover operating expenses. During 1952-56 agricultural credit averaged 27 percent of the value of agricultural production, varied considerably thereafter, and then dropped to just over 6 percent in 1976 (table 2). The extension of credit usually reached producers who had sufficient collateral, that is, owned their land. By contrast the cost of Brazil's credit program in recent years about equaled the value of the country's agricultural output.

In 1977 authorities established significant financial reforms, mainly raising interest rates to adjust for inflation. In fact interest rates in real terms went from negative to positive during 1977-80 (19). When the cost of credit rose, agricultural producers reduced their demand for long-term credit to purchase capital and land but continued to incur short-term debt to meet operating expenses. Demand for medium-term credit (1 to 3 years) declined, but longer term loans (up to 10 years) almost disappeared. Estimated demands for agricultural credit dropped 40 to 50 percent from earlier years (32).

To alleviate the high cost of credit, the Government initiated a program in June 1981 that permitted producers to borrow dollars at international interest rates, 80 percent below the Argentine equivalents at that time. Both short-term loans (6 to 9 months) and longer term credit were available. The attractiveness of the new loan program was reduced because the difference between domestic and international interest rates was narrowed in the face of an overvalued peso. In addition, many small producers, unable to meet collateral requirements, were excluded.

Table 2—Values of agricultural production and agricultural credit, 3-year averages

Period	Agricultural product value (A)	Agricultural credit value (B)	Credit/product ratio (B:A)
-----Million pesos-----			Percent
1963-65	4,203	602	14.3
1966-68	7,576	1,564	20.6
1969-71	12,456	2,964	23.8
1972-74	49,277	8,557	17.4
1975-77	1,243,703	128,687	10.3
1978-79	11,454,579	2,115,052	18.5

Sources: (4, 6, 16).

Tax Policy

The overall domestic tax take was low by industrial world standards, averaging 22 percent of Gross Domestic Product (GDP) during the seventies and early eighties compared to over 30 percent for the United States and other Western nations.¹² Widespread tax avoidance and inefficient collection techniques generally contributed to low tax returns.

Federal taxes on profits, sales, and marketing services directly affected farmer returns, but these taxes amounted to a relatively small share of production value. Federal crop and livestock taxes averaged 2.3 percent of value added by agriculture during 1960-74 (27). Provincial taxes on real estate and incomes accounted for the remainder. Large cattle producers, politically strong at the provincial level, generally influenced local land tax policy in their favor. Low real estate taxes encouraged extensive cattle operations, which were also particularly suited to absentee ownership, low-risk investment, and as a hedge against inflation.

The Government attempted to streamline and improve tax collection by replacing 22 specialized sales taxes with a VAT. The VAT substituted for employers' (including farmers') contributions to social security and housing, which constituted 20 percent of the average wage, and the VAT replaced the specific-use taxes on cattle sales, grain and oilseed exports, and processed farm products. The new tax system also shifted some of the tax burden from the farmer, as an employer, to the consumer. The World Bank estimated that producers of agricultural exports realized a net income benefit of 5 percent under the revised tax structure (43).

By 1980 the VAT accounted for almost 40 percent of total federal revenue (13). The present VAT rate averages 20 percent on all goods and 8 percent on fresh and some processed foods. Commodities, such as oilseed byproducts and prepared meats, receive the 10-percent rate, but grains and oilseeds, unprocessed before export, escape the VAT. Agricultural inputs are also taxed under the VAT system. The Government decided in early 1984 to reduce the VAT on fertilizers and herbicides from 18 to 5 percent to stimulate crop production.

¹²Sources: U.S. Dept. of State, American Embassy, Buenos Aires, "Economic Policy Profile - Argentina," Jan. 27, 1984; and the Tax Foundation, as reported in the Business and Finance Section of the Washington Post, Feb. 27, 1983.

Policy Implications

A central theme in past studies of Argentine agriculture addressed the failure of the agricultural sector to develop fully its potential to expand production and trade (10, 14, 16, 17, 22, 26, 28). Much of the criticism was directed at policies, already reviewed in this report, particularly trade policies, which apparently reduced product prices and raised input costs. Producers faced a classical price/cost squeeze where macroeconomic decisions largely determined net returns. Political instability and policy vagaries further stifled production incentives by creating uncertainty as to Government policy intentions. To overcome these deterrents, producers developed production patterns and adopted technologies suitable to the perceived policy signals.

Price Relationships

Domestic grain and oilseed prices were subject to downward pressures resulting from policies designed to dampen inflation, raise revenues, and redistribute farm income to industrial sectors. High import tariffs, which span the period under review, raised agricultural input costs by protecting domestic industry and by increasing the price of imported goods.

Producer prices were generally depressed by trade policies. Grain prices dropped relative to the traded prices, prompted by sustained high export taxes and low exchange rates, such as during 1947-52 and 1974-75 (table 3). Producer prices improved when the Government raised official prices to stimulate exports during the mid-fifties and midsixties. The export tax declined during the latter period, and producers increased their share of the export value after 1976 when domestic price controls disappeared and export taxes decreased. The peso, however, continued to be overvalued.

From the midsixties to the seventies, the spread between domestic and export prices narrowed, so that the average margin for the three major grain exports ranged from 21 to 24 percent (14 to 18 percent when the 1974-76 period is omitted). Similar estimates for the United States indicated a range of 7 to 12 percent during 1965-79. The difference between Argentine and U.S. price margins likely came from differences in policy orientations as well as in marketing efficiencies. Argentine price differentials narrowed in the early eighties mostly because of reduced export taxes (app. table 7).

Trade policies also distorted agricultural price signals. In an earlier study, Diaz found little empirical evidence of a correlation between domestic and international grain prices during 1951-63. He concluded, "...government policies have substantially interfered with relative price signals from world markets..."(14).

An analysis covering 1965-79 measured similar relationships for wheat, corn, and sorghum, assuming that U.S. export prices were a realistic proxy for international prices and that Argentina was a price taker in the world grain market. The results affirmed Diaz's conclusions for the most recent period that a low correlation and statistical significance existed for each commodity. The results presented a highly distorted price transmission, even if one assumes the normal disruptions between markets and less-than-perfect price information. The situation also increased farmers' uncertainty of price signals for their export crops.

High tariffs, combined with depressed producer prices, increased the relative cost of modern technology, much of which was imported. An international comparison of the use of variable factors of production per unit of output showed higher relative costs in Argentina, except for la-

Table 3—Wholesale market price for major grains, as a percentage of export value, 3-year averages¹

Period	Wheat	Corn	Sorghum
<i>Percent</i>			
1944-46	75	95	n/a
1947-49	40	51	n/a
1952-52	72	75	n/a
1953-55	129	146	n/a
1956-58	69	86 ²	n/a
1959-61	64	84	82 ³
1962-64	84	105	100
1965-67	96	96	100
1968-70	84	94	88
1971-73	76	76	75
1974-76	38	50	51
1977-79	87	79	65
1980-82 ⁴	93	88	84

n/a = not available.

¹Wholesale prices as quoted on the Buenos Aires grain exchange. Export prices are export unit values. Comparable series for oilseed and beef products were not available.

²1957-58.

³1960-61.

⁴Based on f.o.b. export prices in dollars.

Sources: (5, 9).

bor, compared with other exporting nations (app. table 8). Argentine farmers were generally paying more in terms of output required to purchase a unit of input.

Government intervention in product and input factor markets cut into producer returns (app. table 5). During the 40 years covered, the index of the ratio of agricultural prices relative to nonrural prices tended to be below 100, indicating that prices paid by producers, including farm inputs and household goods, increased faster than prices received. Individual crop prices registered similar growth patterns compared with nonagricultural prices.

The WW II years were particularly difficult for the rural sector as were the sharp reverses during 1950-55 and 1974-76. Prices for the principal grains and oilseeds were fixed during most of these years. Although terms improved in the late seventies, they fell off again during the early eighties. Domestic trade terms since the midsixties favored cattle over crops. The beef index tended to run counter to the crop indexes, and stronger relative beef prices followed the midsixties (app. tables 5 and 6).

Patterns of Production

Because policies dampened producer returns and increased uncertainty, farmers adopted production practices and technologies that helped reduce price risks and costs. Producers took advantage of extensive cattle production, low-cost technology, and crop and cattle rotations. Spreading risks among low-cost production alternatives proved a logical choice for producers given the uncertain political environment that influenced domestic policies.

Mixed Farming Operations While crop area expanded slowly, cattle production increased more rapidly because policies limited crop expansion and favored cattle. Producers coupled grain and oilseed production with most of the cattle operations, including supplemental winter feeding and crop and cattle rotation. The mixed farm became the predominant production unit of the Pampa. Most cattle-only production lay outside the Pampa, mainly to the west and northwest. Feedlots similar to those in the United States are virtually unknown.

Mixed farming practices included the rotation of grain and oilseed crops (alternating between fallow seasons) and double-crop combinations. Shorter cycle wheat hybrids, for a recent example, allowed soybeans to be planted following the wheat harvest; 80 to 85 percent of the soybean crop is planted after wheat, accounting for

1.6 million hectares, a practice, however, which requires the suitable climate conditions of the north-central Pampa. Mixed farming also included the production of dual purpose coarse grains, especially sorghum, for use as forage or as a feed grain.

Cattle operations held less risk than grain and oilseed production. Besides the relative price advantages mentioned earlier, the cattle industry operated with less Government intervention in both product and factor markets, reducing the economic risks associated with changing public policy. Lower *ad valorem* export duties generally applied to beef exports (app. table 7). Reduced taxes on noncarcass exports and specialty cuts promoted higher value exports. The domestic tax structure also favored cattle producers because of generally low taxes, particularly difficult-to-collect land taxes. Relatively low taxes and high inflation encouraged investments in extensive cattle holdings versus the more capital intensive crop sector.

Costs of production ranged lower for cattle which were less vulnerable to Government control partly because of the substitution of relatively inexpensive labor for capital inputs. Cattle production used extensive grazing methods which required fewer manufactured and imported inputs, such as fertilizers, agricultural chemicals, and farm equipment. Cattle production's appeal focused on the complementary nature of crop and cattle rotations, a practice that allowed producers to restore soil fertility without expensive chemical fertilizers and with minimal cultivation.

Technological Developments Little, if any, grain and oilseed area expansion occurred during the past five decades except for crop substitution. Production advances were made largely through improved cultivation practices which included increased use of farm machinery, improved seed varieties, crop rotations, and double-cropping. Beginning in the midsixties, producers began to adopt more modern yield technology for corn and sunflowers, but it wasn't until the midseventies that yield advances were sustained at the national level for most crops (app. table 3).

Higher industrial wages, generous social benefits, including food subsidies, and labor reforms prompted the emigration of rural labor to cities during the forties and fifties. By 1960 the rural sector accounted for only 18 percent of the employment force (33). The remaining rural labor force also received improved economic and social bene-

fits which reduced the demand for labor because of increasing costs.

The *Estatuto de Peron* (1944) and revised rental laws (1948) changed the economic relationship between rural labor and landowner. The minimum rural wage increased, land rents remained constant between 1948 and 1955, landowners were prohibited from evicting tenants, and, beginning in 1957, annual leases replaced the old system of multiyear contracts. Land devoted to tenant farming dropped from 21 million hectares in 1947 to 9 million by 1960 (22).

To offset a reduced labor force, owners began purchasing labor-saving machinery, such as tractors, harvesters, seeders, and other cultivation equipment. A smaller labor supply encouraged use of agricultural chemicals, especially herbicides. Small- to medium-sized producers employed contract harvesting, and in some cases, contract planting and other cultivation services to substitute for manual labor. Farmers devoted more land to cattle raising, which required fewer labor hours per hectare than most grain and oilseed alternatives.

Argentine farmers increased plantings of improved seed varieties after the midsixties. Average corn yields increased significantly because of improved seeds (15). In most cases, however, scientists developed new varieties more to meet local soil and climate conditions rather than to increase yields. Fertilizer-responsive hybrids received little attention until the use of Mexican wheat varieties in the late sixties. Since then Argentina has upgraded and expanded hybrid seed development, especially for sorghum and sunflowers.

Farmers used agricultural chemicals only for a few grain and oilseed crops. Growers mainly used herbicides to control weeds on field crops following the decline of the rural labor force.¹³ Most pesticides protected high-valued, intensively produced crops, such as fruits, potatoes, vegetables, tobacco, and sugarcane. Average pesticide use has changed little from the two-thirds kilogram-per-hectare rate of the early sixties.

Low fertilizer use was by far the most significant difference between Argentine cultivation techniques and those of other countries. The high cost of chemical fertilizers,

¹³Coscia wrote that weeding cornfields by hand required 30 hours per hectare compared with 30 minutes by machine (15).

good soil fertility, particularly inside the major crop zones of the Pampa, the lack of research on crop hybrids, and inconclusive yield-response trials were factors that made investment in fertilizers a high-risk option.

Fertilizer applications increased significantly after 1976, principally on wheat. Wheat fertilizing grew from 2 percent of total area planted in 1977 to 13 percent by 1980, fell to 8 percent in 1981, and again reached 13 percent in 1983. Several factors contributed to greater fertilizer use including the relaxation of import barriers leading to reduced producer costs, the introduction of fertilizer-responsive wheat varieties in the late sixties, and the wheat and soybean double-cropping after the midseventies which provided additional income to purchase fertilizers.

Despite the advances in technology, productivity remained low compared with that of other grain-exporting nations. Argentina's per capita grain output ranged lower than that of the United States, Australia, Canada, and France (table 4). More important, labor productivity from the midsixties to the late seventies grew more rapidly in the other countries.

Concluding Remarks

The pressing needs of changing economic and political circumstances have generally overshadowed rural sector concerns since the thirties. Growers have not been highly productive. Unfavorable prices have plagued the grain and oilseed sectors. Political instability, fueled by high inflation, created an environment of speculation and policy vagaries. Government actions bred uncertainty because of such practices as late announcements of support prices, changes in the foreign exchange regime, unscheduled peso devaluations, and frequent changes in

external taxes and tariffs. Producers faced an economic and political climate which inhibited longrun investments and encouraged low-risk cultivation practices.

Mixed cultivation and less intensive use of inputs were rational responses to minimal economic incentives and high risks. To increase output substantially, crop specialization may be necessary before more intensive production techniques and economies of scale can be realized. Although productivity gains have been made since the midseventies, grain and oilseed production remains governed by restrictive policies rather than by production incentives. A change in historical domestic and trade policies would be necessary for producers to consider taking the risk of replacing extensive cattle operations and mixed farming practices with a single-crop system.

The lack of emphasis on agricultural development, especially technological advancements, hampered farm sector growth. Both agricultural land and production capacity could be more efficiently used to expand Argentina's output and its share of world grain and oilseed trade. Large areas of underutilized land are available for increasing grain and oilseed production on land now devoted to mixed farming. This would require the reduction of cattle herds, more intensive beef production, or the movement of cattle onto less productive lands on the fringes of the Pampa. By raising average yields to near U.S. levels, production of wheat and corn would double, sunflower output would increase by a third, and grain sorghum would rise by about a fifth.

The current economic crisis and the newly elected Government provide both additional problems and opportunities for expanding agricultural production and trade. Inflation is running over 500 percent per year, unemployment is up, and the economy is deep in debt. High inflation will make it difficult to achieve exchange

Table 4—Labor productivity of principal grain exporters, 4-year averages

Period	Argentina	United States	Canada	Australia	France
<i>Metric tons per worker</i>					
1961-64	9.4	36.9	n/a	22.5	6.0
1965-68	11.7	45.7	44.4	29.1	8.4
1969-72	12.5	62.5	50.4	38.2	12.2
1973-76	15.8	82.5	60.0	41.6	16.4
1977-80	17.4	115.8	73.3	58.4	18.4

n/a = not available.

Sources: (11, 33).

rate parity with the world's major currencies, thus reducing Argentina's competitive position for its agricultural exports. Domestic and foreign debt (estimated at over \$40 billion) will also limit opportunities for agricultural development during the next few years. With the public debt estimated at 18 percent of the gross national product, Argentine authorities may be tempted to maintain high export taxes to generate needed revenues. The lowering of import tariffs may increase reliance on other revenue sources, especially export taxes and the VAT.

On the other hand, pressure is also building to increase export earnings to help alleviate the huge foreign debt. Expansion of grain and oilseed exports would be critical then because of the large share of total trade accounted for by these commodities. The Argentine Government has recognized the importance of this export sector and has begun to formulate policies to stimulate output. Plans call for increasing grain and oilseed production by expanding crop area, increasing fertilizer use, and improving storage and transportation facilities.

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Appendix table 1—Agricultural production in Argentina, 5-year averages 1931-82

Period ¹	Wheat	Corn	Sorghum	Total grains	Sun-flowers	Flax-seed	Soybeans	Total oil-seeds	Forage crops	Industrial crops ²	Fruits	Vegetables	Total
1,000 metric tons													
1931-35 ³	6,639	8,614	---	17,101	24	1,889	---	1,993	6,147	4,615	1,459	1,272	32,587
1936-40 ³	6,036	7,671	---	15,327	217	1,513	---	1,808	4,698	6,238	1,705	1,126	30,902
1941-45	6,384	6,582	---	14,664	741	1,406	---	2,471	6,946	6,358	2,230	2,048	34,717
1946-50	5,273	3,775	---	11,170	862	801	---	2,019	6,839	8,419	2,346	2,215	33,008
1951-55	5,884	3,051	28	11,753	554	454	1	1,506	5,350	10,114	2,839	2,719	34,281
1956-60	6,143	4,083	429	13,920	665	587	1	1,896	6,212	11,758	3,180	2,910	39,876
1961-65	7,165	4,984	1,144	15,666	625	761	12	2,137	6,513	12,258	3,926	3,448	43,948
1966-70	6,481	7,666	2,342	18,369	972	536	24	2,215	6,029	11,056	4,710	3,849	46,228
1971-75	6,158	8,618	4,542	21,301	848	401	278	2,290	3,832	15,380	5,693	3,853	52,349
1976-80	8,214	7,791	5,604	23,519	1,333	629	2,359	5,026	2,751	15,890	6,332	3,943	57,461
1981 ⁴	7,780	12,900	7,550	29,009	1,260	585	3,770	6,100	n/a	n/a	n/a	n/a	n/a
1982 ⁴	8,100	9,600	8,000	26,404	1,780	600	4,000	6,905	n/a	n/a	n/a	n/a	n/a

--- = none reported.

n/a = not available.

¹Based on crop years 1930/31-1981/82.

²Cotton, sugar, tobacco, tea, grapes, and minor oilseeds.

³Totals exclude minor commodities before 1940/41.

⁴Unofficial USDA estimates.

Source: (9).

Appendix table 2—Area planted to agricultural commodities in Argentina, 5-year averages 1931-82

Period ¹	Wheat	Corn	Sorghum	Total grains	Sun-flowers	Flax-seed	Soybeans	Total oil-seeds	Forage crops	Industrial crops ²	Fruits	Vegetables	Total
1,000 hectares													
1931-35 ³	7,838	6,171	---	16,880	---	---	---	3,223	5,616	439	253	333	26,946
1936-40 ³	7,553	6,457	---	17,403	298	2,962	---	3,362	5,443	752	260	398	27,618
1941-45	6,860	4,733	---	15,850	1,013	2,464	---	3,706	6,096	744	291	324	27,011
1946-50	5,877	3,146	---	13,609	1,615	1,545	---	3,423	6,875	860	346	409	25,552
1951-55	5,940	2,919	53	14,086	1,044	844	1	2,186	8,015	1,014	416	440	26,157
1956-60	5,394	2,889	430	14,985	1,367	1,167	1	2,913	8,480	1,155	501	450	28,484
1961-65	5,369	3,483	1,109	15,172	1,208	1,304	18	2,853	7,912	1,124	536	439	28,036
1966-70	6,309	4,362	1,872	17,400	1,313	952	24	2,696	7,195	939	532	474	29,236
1971-75	4,903	4,338	2,806	16,983	1,467	591	212	2,719	5,201	1,118	594	475	27,090
1976-80	5,555	3,277	2,440	16,107	1,767	821	1,218	4,267	4,405	1,230	637	584	27,230
1981 ⁴	6,196	4,000	2,400	16,651	1,390	780	1,925	4,641	n/a	n/a	n/a	n/a	n/a
1982 ⁴	6,473	3,695	2,712	16,023	1,637	800	2,039	5,197	n/a	n/a	n/a	n/a	n/a

--- = none reported.

n/a = not available.

¹Based on crop years 1930/31-1981/82.

²Cotton, sugar, tobacco, tea, grapes, and minor oilseeds.

³Totals exclude minor commodities before 1940/41.

⁴Unofficial USDA estimates.

Sources: (2, 9).

Appendix table 3—Argentine yields for selected grains and oilseeds, 1949/50-1981/82

Crop year	Wheat	Corn	Grain sorghum	Linseed	Sunflowers	Soybeans
<i>Kilos per hectare</i>						
1949/50	1,185	888	---	704	746	---
1950/51	1,106	1,558	---	704	746	---
1951/52	766	1,426	---	699	653	---
1952/53	1,368	1,507	---	672	683	---
1953/54	1,241	1,843	1,725	742	761	---
1950-54 (avg.)	(1,123)	(1,444)	---	(695)	(723)	---
1954/55	1,416	1,361	1,796	640	698	---
1955/56	1,292	1,728	1,360	536	691	---
1956/57	1,317	1,379	1,607	576	647	---
1957/58	1,322	1,963	2,452	586	581	---
1958/59	1,282	2,089	1,739	623	451	---
1955-59 (avg.)	(1,326)	(1,705)	(1,791)	(592)	(614)	---
1959/60	1,333	1,701	1,673	739	734	968
1960/61	1,160	1,767	2,265	587	651	977
1961/62	1,295	1,894	2,151	698	718	1,163
1962/63	1,522	1,648	1,660	638	611	972
1963/64	1,575	1,801	1,751	634	628	1,146
1960-64 (avg.)	(1,377)	(1,762)	(1,900)	(659)	(668)	(1,045)
1964/65	1,835	1,678	1,458	752	746	1,035
1965/66	1,321	2,150	2,524	568	765	1,147
1966/67	1,198	2,466	1,805	721	902	1,188
1967/68	1,260	1,942	1,752	625	891	1,089
1968/69	983	1,929	1,908	630	737	1,124
1965-69 (avg.)	(1,319)	(2,033)	(1,889)	(659)	(808)	(1,117)
1969/70	1,352	2,330	2,041	809	846	1,032
1970/71	1,329	2,442	2,085	816	632	1,624
1971/72	1,267	1,862	1,663	700	644	1,143
1972/73	1,591	2,721	2,328	748	658	1,732
1973/74	1,657	2,840	2,539	762	815	1,440
1970-74 (avg.)	(1,439)	(2,439)	(2,131)	(767)	(719)	(1,394)
1974/75	1,410	2,508	2,492	761	728	1,363
1975/76	1,626	2,117	2,759	845	862	1,603
1976/77	1,711	3,278	2,776	915	730	2,121
1977/78	1,855	3,647	3,194	916	800	2,174
1978/79	1,729	3,107	3,033	734	918	2,313
1975-79 (avg.)	(1,566)	(2,931)	(2,851)	(834)	(808)	(1,915)
1979/80	1,692	2,570	2,314	760	890	1,724
1980/81	1,549	3,801	3,595	806	984	2,005
1981/82	1,459	3,039	3,209	811	1,133	2,015

--- = none reported.

Source: (9).

Appendix table 4—Ratio of wholesale market prices (during harvest)¹ to the official support price, selected crops, 3-year averages, 1951-79¹

Period	Wheat	Corn	Sorghum	Sunflowers	Linseed	Soybeans
<i>Index</i>						
1951-52	88	98	n/a	113	97	n/a
1953-55	92	117	n/a	98 ²	96	n/a
1956-58	92	104	n/a	105	102	n/a
1959-61	92	122	159	155	113	n/a
1962-64	97	130	131	128	108	n/a
1965-67	101	132	138	104	104	104 ³
1968-70	98	113	114	116	104	102
1971-73	104	134	131	182	127	146
1974-76	95	86	92	92 ⁵	181 ⁵	114 ⁵
1977-79	77	149 ⁴	154 ⁴			

n/a = not available.

¹Index value over 100 indicates the wholesale price exceeded the support price in effect at harvest. ²1954-55. ³1966-67. ⁴1977. ⁵Official support price no longer in effect.

Sources: (5, 9).

Appendix table 5—Index of domestic terms of trade between agricultural and nonagricultural commodities, 3-year averages¹

Period	Total agriculture ²	Wheat	Corn	Grain sorghum	Sunflowers	Linseed	Beef
<i>1960=100</i>							
1938-40 ³	100	102	81	n/a	98	112	80
1941-43	71	63	37	n/a	63	48	72
1944-46	79	90	94	n/a	79	65	63
1947-49	94	118	84	n/a	n/a	94	69
1950-52	81	81	77	n/a	63	59	66
1953-55	80	85	78	n/a	46	61	72
1956-58	92	84	91	89	100	104	71
1959-61	100	93	100	97	117	112	98
1962-64	110	115	116	106	110	103	101
1965-67	96	95	98	99	84	78	106
1968-70	100	101	100	101	92	92	100
1971-73	120	88	84	89	108	92	149
1974-76	92	67	63	71	83	126	91
1977-79	93	92	75	75	103	91	98
1980-82	82	93	64	72	70	72	93

n/a = not available.

¹Ratio of a wholesale price index for each agricultural commodity to the wholesale price index of nonagricultural goods (multiplied by 100). ²Ratio of the agricultural wholesale price index to the nonagricultural index. ³1939-40.

Note: A value below 100 indicates that the price of agricultural commodities increased at a slower rate than nonagricultural goods, including imported commodities.

Sources: (1, 3, 9, 14).

Appendix table 6—Ratio of beef to grain and oilseed prices, 3-year averages, 1950-82¹

Period	Wheat	Corn	Sorghum	Soybeans	Sunflowers	Linseed
<i>Index</i>						
1950-52	4.0	4.2	---	---	3.0	2.8
1953-55	4.0	4.5	5.0 ²	---	4.1	3.0
1956-58	4.1	3.8	7.2	---	1.8	1.7
1959-61	5.4	4.8	6.4	---	2.2	2.2
1962-64	4.2	4.3	6.1	---	2.3	2.5
1965-67	6.8	5.2	6.6	3.2	3.2	3.3
1968-70	4.8	4.9	6.3	2.8	2.8	2.8
1971-73	8.0	8.6	10.4	3.5	3.5	4.3
1974-76	6.5	7.2	8.1	2.3	3.3	1.8
1977-79	5.2	6.6	8.3	2.9	2.6	2.7
1980-82	4.8	7.0	7.9	3.9	3.6	3.3

--- = none reported.

¹Ratio of the wholesale price of 1 metric ton of beef to the price of 1 ton of grain or oilseeds. ²1954-55 average.

Sources: (1, 9).

Appendix table 7—*Ad valorem* export duties for grains, oilseeds, and beef, December 1958 through July 1982

Period	Wheat for bread	Corn	Grain sorghum	Beef ¹
<i>Percent</i>				
Tax change from:				
1958 December	25.0 ²	25.0 ²	25.0 ²	10.0
1960 October	18.0 ³	18.0 ³	18.0 ³	n/c
1962 February	n/c	0	n/c	n/c
1963 November	10.0	10.0	10.0	n/c
1965 April	n/c	6.5	n/c	9.5
Nov.-Dec.	n/c	n/c	n/c	6.0
1966 April	n/c	10.0	n/c	3.0
September	n/c	16.0	n/c	n/c
October	0	n/c	n/c	n/c
Nov.-Dec.	n/c	n/c	n/c	0
1967 February	n/c	0	0	n/c
March	12.0	25.0	25.0	16 to 25
September	18.0	n/c	n/c	n/c
October	n/c	n/c	n/c	8 to 18
1968 February	n/c	18.0 ⁴	18.0 ⁴	n/c
July	n/c	n/c	n/c	10 to 15
October	6.0	8.0	n/c	n/c
1969 February	n/c	n/c	8.0	n/c
December	n/c	n/c	n/c	8 to 12
1970 June	18.5	20.5	20.5	n/c
July	17.0	19.0	19.0	n/c
1971 December	24.0	25.0	25.0	0 to 15
1972 February	30.0	31.0	31.0	n/c
March	36.0	37.0	37.0	n/c
April	n/c	31.0	31.0	n/c
June	n/c	n/c	n/c	16 to 29 ⁵
November	23.0	n/c	n/c	n/c
Period	Wheat for bread	Corn	Grain	Soybeans
<i>Percent</i>				
Tax change from:				
1973 March	n/c	19.0	29.0	n/a
April	n/c	16.0	24.0	n/a
June	31.0 ⁶	34.0 ⁷	35.0 ⁸	27 to 40 ⁷
July	n/c	44.0 ⁹	45.0 ¹⁰	n/c
August	n/c	n/c	n/c	15 to 28 ¹¹
1974 January	n/c	34.0 ¹²	n/c	n/c
June	n/c	8.0	0	n/a
July	n/c	n/c	n/c	0 to 13
October	n/c	25.0	23.0	n/c
1975 January	n/c	n/c	n/c	0
March	40.0	35.0	33.0	n/e
April	15.0	10.0	0	n/e
June	40.0	40.0	40.0	10 to 30
November	50.0	50.0	50.0	n/e
1976 January	40.0	40.0	40.0	n/e
February	56.0	56.0	56.0	n/e
March	n/c	n/c	n/c	n/e
April	50.0	50.0	50.0	n/e
May	n/c	n/c	n/c	0 to 10
August	40.0	n/c	n/c	n/e
September	10.0	n/c	n/c	n/e
November	0	n/c	n/c	n/e
December	n/c	10.0	10.0	n/e
1977 March	n/c	0	0	n/e
1981 April ¹³	12.0	12.0	12.0	n/e
1982 July	25.0	25.0	25.0	0 to 20

n/c = no change.

n/a = not available.

¹A single tax rate refers to traditional beef exports such as fresh and frozen quarters. A tax range refers to all beef export commodities, including processed products. ²Includes a 5-percent sales tax. ³Includes an 8-percent sales tax. ⁴Includes a 10-percent sales tax. ⁵Includes a 4-to 8-percent mobile (temporary) tax. ⁶Includes an 8-percent mobile tax. ⁷Includes a 15-percent mobile tax. ⁸Includes an 11.3-percent mobile tax. ⁹Includes a 13-percent mobile tax. ¹⁰Includes a 14-percent mobile tax. ¹¹Includes a 3-to 6-percent mobile tax. ¹²Includes a 3-percent mobile tax. ¹³To be reduced by 1 percent per month until eliminated.

Source: (9, 39)

Appendix table 8—Relative cost of purchasing primary agricultural inputs, product weight in metric tons per unit of input, selected countries and periods¹

Items	1960/63	1968/71	1976/79	Items	1960/63	1968/71	1976/79				
Wheat in metric tons needed to purchase:											
Nitrogen fertilizer (1 ton):											
ARGENTINA	10.3	7.1	6.2	Corn in metric tons needed to purchase (cont):							
United States	3.4 ²	3.8	3.7	Phosphate fertilizer (1 ton):							
Australia	3.8	3.4	3.7 ³	ARGENTINA	7.8	6.2	10.5				
France	3.7 ²	2.6	2.9 ³	United States	4.1	3.6	4.1				
Italy	n/a	2.2 ⁴	n/a	France	2.7 ²	2.4	3.2 ⁵				
Brazil	n/a	2.4 ⁵	3.1	2-4D herbicide (100 liters):							
Phosphate fertilizer (1 ton):				ARGENTINA	3.2	2.7	2.9				
ARGENTINA	8.1	5.9	8.8	United States	.8	.7	.9				
United States	2.6	3.5	3.4	France	n/a	.5 ⁸	.5 ⁵				
Australia	1.9	1.4	2.0 ⁵	Tractor (1 horsepower):							
France	2.5 ²	2.2	3.1 ⁵	ARGENTINA	3.2	3.0	4.1				
Fuel (1,000 liters):				United States	2.1 ²	2.3	2.2				
ARGENTINA	1.5	1.2	2.0	France	1.1 ⁶	.9	1.0 ⁵				
United States	.6	1.0	1.2	Italy	n/a	1.4 ⁸	n/a				
Australia	.9	.9	1.0 ⁵		Items	1965/68	1969/72	1976/79			
France	.5 ²	.6	1.1 ⁵	Beef in metric tons needed to purchase:							
Farm labor (100 hours):											
ARGENTINA	0.7	1.5	1.4	Phosphate fertilizer (1 ton):							
United States	1.4	3.4	3.0 ⁵	ARGENTINA	1.26	0.91	1.53				
Australia	1.3	1.7	2.6 ⁵	United States	.40	.35	.39				
France	.4 ²	.7	2.0 ⁵	Australia	n/a	.28 ⁹	n/a				
Tractor (1 horsepower):				France	.33	.24	.32				
ARGENTINA	3.0	2.5	3.0	Brazil	1.97	1.36	1.42 ⁵				
United States	1.3 ²	2.2 ⁷	1.8	Farm labor (1 month):							
Australia	1.6	1.6 ⁷	n/a	ARGENTINA	0.40	0.35	0.45 ¹⁰				
France	1.0 ⁶	.9	1.0 ⁵	United States	.37	.38	.40				
Italy	n/a	1.6 ⁶	n/a	Brazil	.30	.22	.19				
Corn in metric tons needed to purchase:				Fuel (1,000 liters):							
Nitrogen fertilizer (1 ton):				ARGENTINA	0.24	0.19	0.30				
ARGENTINA	10.0	7.5	7.5	United States	.08	.07	.12				
United States	5.4 ²	4.0	4.6	France	.06	.07	.09 ¹¹				
France	4.1 ²	2.8	2.9 ³	Brazil	.46	.38	.38				
Italy	n/a	2.6 ³	n/a	Tractor (1 horsepower):							
Brazil	n/a	n/a	5.1	ARGENTINA	0.47	0.35	0.50				
				United States	.18	.14	.19				
				France	.13	.09	.08 ¹¹				
				Brazil	.56	.35	.26 ¹¹				

n/a = not available.

¹The figures correspond to the amount of product which had to be produced to equal the value of the corresponding units of inputs (based on nominal prices).
²1961-63. ³1976-78. ⁴1968-72. ⁵1970-73. ⁶1962-63. ⁷1968-69. ⁸1969-71. ⁹1971. ¹⁰1973-76. ¹¹1973-75.

Sources: (11, 12, 26, 29, 42).

Appendix table 9—Production growth rates of grains and oilseeds for selected countries, 1965-79¹

Commodity/country	Growth rate	Commodity/country	Growth rate
<i>Percent</i>			<i>Percent</i>
Wheat:		Sorghum:	
India	8.18	ARGENTINA	13.65
United Kingdom	4.38	Australia	13.49
Turkey	4.14	Mexico	4.13
United States	3.55	India	2.13
Australia	3.46	United States	.56
France	2.89	Nigeria	.39
Mexico	2.61		
ARGENTINA	2.07	Linseed:	
Soviet Union	1.52	India	3.16
Canada	.83	ARGENTINA	1.35
Italy	-1.11	Canada	-.26
Spain	-1.32	Soviet Union	-5.03
		United States	-8.18
Corn:		Sunflowers:	
Thailand	7.82	United States	36.83
France	6.57	ARGENTINA	2.69
Italy	4.44	Romania	1.77
United States	4.24	Soviet Union	-.95
South Africa	4.23		
Nigeria	3.66	Soybeans:	
Brazil	2.61	ARGENTINA	52.33
ARGENTINA	1.97	Brazil	30.38
India	1.04	United States	5.89
Mexico	.62		
Soviet Union	.57		

¹Calculated from a semilog regression trend.

Source: (38).

Appendix table 10—Total grain yields and compound growth rates for selected countries

Country	Average yield		Growth rate (1969/71-1979/81)
	1969/71	1979/81	
<i>- - -Kilos per hectare- - -</i>			
United Kingdom	3,724	4,763	2.5
France	3,596	4,661	2.6
West Germany	3,668	4,416	1.9
United States	3,458	4,162	1.9
Italy	2,794	3,559	2.4
Eastern Europe ¹	2,683	3,534	2.8
ARGENTINA	1,710	2,196	2.5
Canada	2,068	2,170	.5
Mexico	1,522	2,109	3.3
Spain	1,596	1,984	2.2
Thailand	2,014	1,944	-.4
Turkey	1,353	1,855	3.2
South Africa	1,184	1,612	3.1
Brazil	1,334	1,500	1.2
Soviet Union	1,475	1,445	-.2
India	1,108	1,341	1.9
Australia	1,201	1,304	.8
Nigeria	652	720	1.0

¹Average yield for Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania, and Yugoslavia.

Source: (34).

Appendix table 11—Oilseed yields and compound growth rates for selected countries

Country	Average yield (1979/81)			Growth rate (1969/71-1979-81)		
	Soybeans	Sunflowers	Linseed	Soybeans	Sunflowers	Linseed
- - - - - Kilos per hectare - - - - -						
Canada	2,361	1,338	904	2.4	5.2	0.8
ARGENTINA	2,014	923	762	4.5	2.2	-.3
United States	1,195	1,312	794	.9	1.8	.7
Mexico	1,860	---	---	-.1	---	---
Brazil	1,519	---	---	2.6	---	---
Paraguay	1,408	---	---	-.2	---	---
Japan	1,384	---	---	-.7	---	---
Korea	1,213	---	---	4.5	---	---
China	1,045	1,346	---	.1	4.4	---
Indonesia	881	---	---	1.9	---	---
Eastern Europe ¹	---	1,714	---	---	1.4	---
Turkey	---	1,303	---	---	1.7	---
South Africa	---	1,280	---	---	5.4	---
Soviet Union	---	1,135	185	---	-1.3	-5.0
Australia	---	681	---	---	0	---
Spain	---	649	---	---	-2.2	---
India	---	---	223	---	---	-.6

--- = none reported.

¹Average yield for Bulgaria, Hungary, Romania, and Yugoslavia.

Source: (34).

Appendix table 12—Indicators and ranking of agricultural technology use in selected countries, 1978-80

Country	Technological indicators			Ranking			
	Fertilizer ¹	Tractors ²	Irrigated land ³	Fertilizer	Tractors	Irrigation	Average
Italy	181.0	81.5	23.2	3	1	1	1.7
France	304.0	77.0	5.0	1	2	10	4.3
United States	111.0	25.4	9.5	4	4	6	4.7
Spain	80.1	23.8	14.5	5	5	5	5.0
United Kingdom	301.1	71.0	2.0	2	3	14	6.3
South Africa	72.2	13.4	7.6	7	8	7	7.3
Soviet Union	78.2	10.9	7.3	6	9	8	7.7
Mexico	48.9	4.9	21.8	9	12	3	8.0
Turkey	48.6	14.3	7.3	10	7	9	8.7
India	29.2	2.2	22.6	12		2	9.3
Canada	42.2	15.2	1.1	11	6	15	10.7
Brazil	60.8	5.3	2.5	8	11	13	10.7
Thailand	17.5	2.0	15.3	14	15	4	11.0
Australia	29.0	7.8	3.5	13	10	12	11.7
ARGENTINA	3.4	4.9	4.5	16	13	11	13.3
Nigeria	3.9	.3	.1	15	16	16	15.7

¹Kilos of fertilizer per hectare of arable land, including annual and permanent crops, cultivated pasture, forage crops, and land in fallow.²Number of tractors per 1,000 hectares of arable land.³Irrigated land is a percentage of total arable land.

Source: (36).

Appendix table 13—Argentina's share of world agricultural exports, selected commodities and years, as a percentage of total volume

Commodity	1924/33	1934/38	1948/52	1956/60	1961/65	1966/70	1971/75	1976/79	1980/82
<i>Percent</i>									
Wheat ¹	18	23	9	8	7	6	3	5	4
Corn	65	64	24	18	13	15	10	8	8
Sorghum	0	0	0	9	17	19	25	36	29
Sunflowers ²	n/a	n/a	62	n/a	94 ³	65	60	25	64
Linseed ²	78	79	n/a	57	80	61	44	43	62
Soybeans ⁴	0	0	0	0	0	0	0	5	8
Beef	58	56	38	37	29	20	9	10	7
Wool ⁵	12	12	11	0	8	7	4	7	7
Total	n/a	n/a	n/a	3.0	3.1	2.9	2.4	2.6	2.5

n/a = not available.

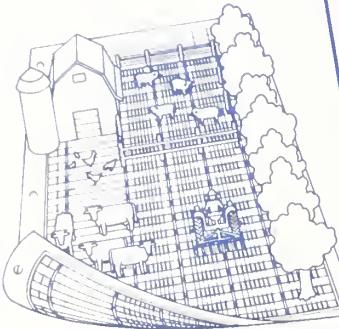
¹Excludes wheat flour.²Mostly meal after the midforties.³1959-63.⁴Bean exports only, but in recent years, soybean meal exports have increased.⁵Greasy and degreased wool.

Sources: (14, 21, 25, 31, 35).

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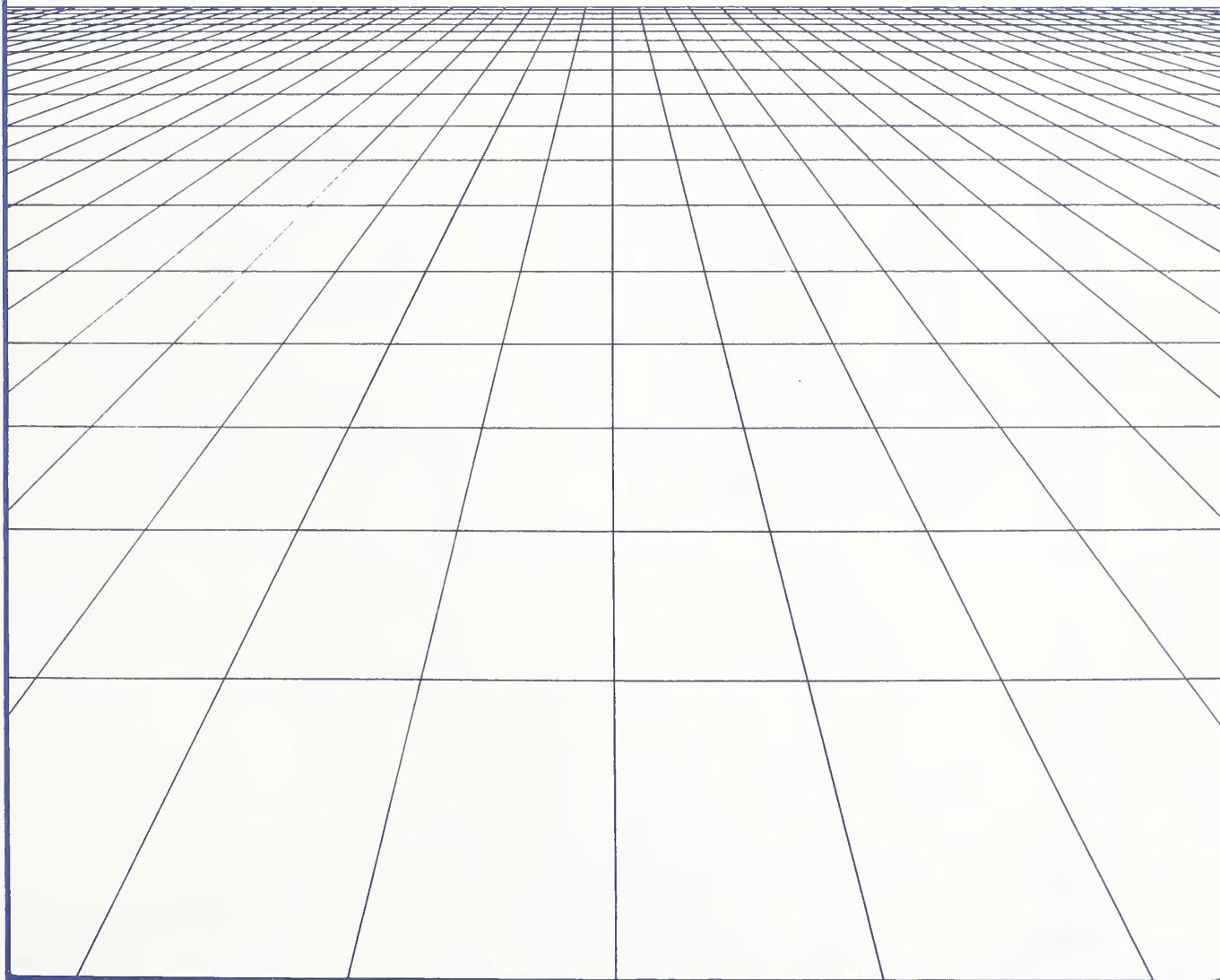
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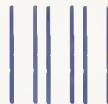
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